Claim

1.   An optical measurement apparatus for living body comprising a means for irradiating visible to infrared light onto an object to be examined, a means for detecting light transmitted inside said object and generates signals corresponding to the detected amount of light, a signal processing means for processing the signals and generating biological signals of the object to be examined and a display means for displaying the biological signals generated by said signal processing means;

wherein said signal processing means comprises a signal separating means for separating the biological signals into multiple component signals and a signal reconstruction means for reconstructing the biological signals by using specified component signals, excluding those containing noise, of said multiple component signals.

2.   The optical measurement apparatus for living body according to claim 1, wherein said signal displaying means displays separated component signals and reconstructed signals, respectively.

3.   The optical measurement apparatus for living body according to claim 1 or 2, wherein said signal processing means comprises at least two different signal separating means.

4.   The optical measurement apparatus for living body according to any one of claims 1-3, wherein at least one of said signal separating means analyzes the principal components of said biological signals and separates them into multiple component signals.

5.   The optical measurement apparatus for living body according to any one of claims 1-4, wherein at least one of said signal separating means analyzes the independent components of said

biological signals and separates them into multiple component signals.

6. The optical measurement apparatus for living body according to any one of claims 1-5, which said signal processing means further comprises a signal selecting means for selecting specified component signals to be used by said signal reconstruction means.

7. The optical measurement apparatus for living body according to claim 6, wherein said signal selecting means selects said specified component signals based on correlation values between the component signals and a pre-determined reference signal.

8. The optical measurement apparatus for living body according to claim 6, wherein said signal selecting means selects the specified component signals based on the standard deviations of differential waveforms of the component signals.

9. The optical measurement apparatus for living body according to claim 6, wherein said signal selecting means selects the specified component signals based on correlation values between the component signals and a pre-determined reference signal, and the standard deviations of differential waveforms of the component signals.

10. The optical measurement apparatus for living body according to claim 6, wherein signal processing means comprises a user interface means with which users can select specified component signals to be used by said signal reconstructing means.

11. The optical measurement apparatus for living body according to claim 6, wherein multiple principal component waveforms or independent component waveforms and a selecting box for selecting the multiple principal component waveforms

or independent component waveforms are displayed.

12. The optical measurement apparatus for living body according to any one of claims 7 to 9, wherein a correlation value box for inputting the correlation value and/or a standard deviation box for inputting the standard deviation are displayed in said display means.

13. An optical measurement apparatus for living body comprising a means for irradiating visible to infrared light onto multiple positions of an object to be examined, a means for detecting a light irradiated from said multiple positions and transmitted inside the object and generating measurement signals at multiple measurement points which are defined by the irradiating and detecting positions, a signal processing means for processing measurement signals detected by said detection means and generating waveforms indicating changes of substance inside the object at the multiple measurement points and a display means for displaying the results of processing by said signal processing means;
      wherein said signal processing means comprises a signal separating means for separating the waveforms into multiple component waveforms and a signal reconstruction means for reconstructing waveforms representing changes in substance inside said object to be examined by using a specified component waveform among the multiple component waveforms.

14. A method of removing noise from the optical measurement signals of living body obtained by irradiating a light onto the examination site of an object to be examined and detecting a light transmitted through said examination site, comprises a step of analyzing components of the optical measurement signals and separating them into multiple component signals, and a step of reconstructing optical measurement signals by using specified component signals among the separated multiple component signals.

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15. The method of removing noise according to claim 14, wherein the step of separating measured signals into the multiple component signals comprises a step of performing a principal component analysis of the multiple component signals.

16. The method of removing noise according to claim 14 or 15, wherein the step of separating measured signals into the multiple component signals comprises a step of performing an independent component analysis of the multiple component signals.

17. The method of removing noise according to any one of claims 14-16, which comprises a step for separating the optical measurement signals reconstructed by said reconstruction step into multiple component signals and a step for reconstructing signals.

18. The method of removing noise according to any one of claims 14-17, which comprises a step for selecting specified component signals from multiple separated component signals.

19. The method of removing noise according to claim 18, wherein the specified component signals are selected by using correlation values between the component signals and a pre-determined reference signal and/or standard deviations of differential waveforms of the component signals in said selecting step.